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Technology may sell its Boylston street land, but only subject to the restrictions and encumbrances of abutters established by the grant of the land to the institute in 1861 by the legislature. The institute will therefore probably retain its present site for part of its work.

APPOINTMENTS, including changes in title, have been made at Harvard University as follows:

Comfort Avery Adams, Abbott and James Lawrence professor of engineering.

Masaharu Anesaki, professor of Japanese literature and life.

Edwin H. Hall, Rumford professor of physics.

Elmer Peter Kohler, Abbott and James Lawrence professor of chemistry.

Roger Irving Lee, professor of hygiene.

Manoel de Oliveira Lima, professor of Latin-American history and economics.

Robert Williamson Lovett, professor of orthopedics.

William Fogg Osgood, Perkins professor of mathematics.

Wallace Clement Sabine, Hollis professor of mathematics and natural philosophy.

Frank Lowell Kennedy, associate professor of engineering drawing.

Howard Thomas Karsner, assistant professor of pathology.

At Clark College Dr. Robert H. Goddard, late research fellow in Princeton University, has been appointed instructor in physics. Professor Carey E. Melville, assistant professor of mathematics, has taken on the duties of registrar of the college.

DR. SAMUEL RITTENHOUSE, professor of biology at Olivet College, has been elected associate professor of zoology in the University of Southern California.

DR. JOHN W. COX, graduate of the Syracuse University College of Medicine in 1912 and afterward instructor in pathology at Syracuse, has been appointed assistant professor of pathology in the State University of North Dakota.

DR. A. F. SHULL, assistant professor of zoology in the University of Michigan, has been promoted to a junior professorship.

RYLAND M. BLACK, A.M., professor of history and political science in the State Science School, Wahpeton, North Dakota, has been elected to the presidency of the State Normal Industrial Institute at Ellendale of that state.

MR. G. P. THOMSON, scholar of Trinity College, Cambridge, and son of Professor Sir J. J. Thomson, has been appointed to a mathematical lectureship at Corpus Christi College.

DISCUSSION AND CORRESPONDENCE

HAS THE WHITE MAN MORE CHROMOSOMES THAN THE NEGRO?

IN a recent number of SCIENCE (May 15, 1914), Professor Michael F. Guyer complains that in my recent book on "Heredity and Sex" I have given an erroneous impression concerning the relation of his work on human spermatogenesis to that of Montgomery on the same subject. Professor Guyer objects to my statement that while Montgomery's account confirms his own as to the number of the chromosomes it "is in disagreement in regard to the accessory." I think my statement is correct, but in order that the reader may judge for himself, let me quote Montgomery's own summing up:

But Guyer concluded that the two allosomes [sex chromosomes] always pass undivided to one spindle pole in the primary spermatocytes, reaching then only half of the secondary spermatocytes, and in these dividing presumably equationally. He consequently argued two classes of spermatozoa are produced in equal numbers. . . . That is to say, he overlooked the variability in behavior of the allosomes specially studied by me.

After giving his reasons for thinking that this *variability* in the behavior of the allosomes is a normal process, Montgomery concluded that there would "be four classes of spermatozoa and not simply the two classes distinguished by Guyer" (p. 10). And in another connection Montgomery writes . . . if there be only two classes of sperm, as Guyer argues, and one kind of egg, this should result in equal numbers of the sexes and not in the ratio actually known.

These comparisons that Montgomery has himself made seem to more than justify my

remarks that he is not in agreement with Guyer in regard to the accessory. Guyer refers to this matter as only a "slight discrepancy" but to my own way of thinking, it is the only evidence (in default of better evidence, unfortunately) on which we can at present judge concerning the nature of these bodies that Guyer identifies as the sex chromosomes. Irrespective, therefore, of whether Guyer is right or wrong, it still seems to me that Montgomery's statements can not properly be said to be like those of Guyer except for a "slight discrepancy."

It may be invidious to point out here that the kind of evidence that Guyer admits in favor of the two chromosomes in man being sex chromosomes is of the same sort as the evidence that he has brought forward for similar bodies in birds. The recent thorough-going analysis of Pearl and Boring has made apparent that this kind of evidence is in itself inconclusive and unconvincing. The experimental evidence indicates very strongly that in birds the female is heterozygous for a sex factor.

There is another and not unimportant difference between Guyer and Montgomery. Guyer states that a second pairing of the ordinary chromosomes takes place in man. Montgomery says:

I have seen no evidence of any kind of such a pairing of chromosomes in the secondary spermatocytes, neither in my own material nor in that received from Guyer, though I have examined fully two hundred division stages of these cases.

While the second point does not bear directly on the "disagreement" in regard to the sex chromosomes, it raises a doubt as to the value of material that can lead to such diametrically opposed results, for the conflicting statements relate to the same identical preparations.

In order that no misunderstanding may arise I may add that I am entirely in sympathy with the view that in the human race the male is heterozygous in a sex factor; for the experimental evidence relating to sex-linked inheritance strongly indicates that this is the case.

It is with great interest I note in the last paragraph of Guyer's paper a hint (or is it

intended as an announcement?) that the white man has more chromosomes than the negro—a point of view I mentioned¹ in the book under discussion as a possible way of harmonizing Guyer's results with those of v. Winiwarter. If the suggestion is established, some revision may be necessary concerning the Mendelian expectation for the inheritance of skin color in the black-white cross.

T. H. MORGAN

SCIENTIFIC BOOKS

INTRODUCTION TO THE NEW STATISTICS WITH SPECIAL REFERENCE TO THE NEEDS OF BIOLOGISTS

THE number of guides to modern statistical methods consequent upon the realization that mathematical analysis is necessary for the full interpretation of series of observations is now so large that it may be helpful to the beginner to point out some of their chief features.

While Francis Galton's "Hereditary Genius" of 1869 shows the influence of the work of Quetelet, his "Natural Inheritance" of 1889 is probably the first book published in which the modern student can find any consistent comprehensive explanation of the statistical methods as applied to biological problems. While this classic should be familiar to every statistician, it is not suitable as a guide to the beginner, for the formulae there described have been replaced by those better suited to the practical routine of calculation.

Among the earlier treatises on the new statistics—speaking now of introductions and guides, not of original work—may be mentioned those of Duncker¹ and Davenport² written from the standpoint of methods and the volume of Vernon³ prepared more as a

¹ First suggested in 1912 by Gutherz but rejected by him.

¹ Duncker, G., "Die Methode der Variationsstatistik," *Archiv. f. Entwicklungsmechanik d. Organismen*, Vol. VIII., pp. 112-183, 1899.

² Davenport, C. B., "Statistical Methods with Special Reference to Biological Variation," New York, 1899, second ed., 1909.

³ Vernon, H. M., "Variation in Animals and Plants," New York, 1903.